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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the connector suitable for connecting to the body the electrical circuit by the side of the body of small devices, such as a portable telephone with which it was constituted about the connector which two or more contact metallic ornaments come to attach it is still more detailed, for example, rotatable [a body and a lid] to the circumference of a hinge shaft, and the electrical circuit by the side of a lid.

[0002]

[Description of the Prior Art] When a body 11 and a lid 12 as shown in drawing 5 connected electrically the circuit board by the side of a body 11, and the circuit board by the side of a lid 12 conventionally in the small devices 10, such as a portable telephone constituted rotatable at the circumference of the hinge shaft 13, it was carrying out so that lead wire might insert in the inside of a hinge region article. However, the insertion activity of this lead wire became the hindrance of automatic assembling, and had become the factor which reduces working efficiency.

[0003]

[Problem(s) to be Solved by the Invention] Then, in order to avoid the time and effort of this lead-wire insertion activity, when using the connector which two or more contact metallic ornaments come to attach in the body for a part for a hinge region, it sets. If electrical installation with the lead wire linked to contact metallic ornaments and the circuit board is made into the structure surface mounting and terminal through It results in the workability of immobilization or soldering being bad and causing decline in productive efficiency, and the activity concerned being [result] needed for each **, when a large number [contact metallic ornaments], and worsening workability further. Therefore, when such a connector is used for a part for a hinge region and inclusion to a small device and easy-ization of an assembly activity are considered, it is necessary to make [which has high dependability] easy electrical installation contact metallic ornaments and by the side of the circuit board.)

[0004] This invention was made in view of the above-mentioned actual condition, assembly is easy, and the body is small, and is restored to the hinge region of small devices, such as a portable telephone, and the purpose has the electrical installation contact metallic ornaments and by the side of the circuit board in easy and offering the connector which can be carried out to high-reliability.

[0005]

[Means for Solving the Problem] The first description configuration of the connector concerning this invention for attaining this purpose As indicated to claim 1 of the column of a claim, the one way each edge of two or more contact metallic ornaments attached in the body While each another side edge of a projection and said contact metallic ornaments stands in a row in said 1st direction toward the 1st direction where said front face of the body counters from the front face of the body It extends toward said 1st direction and the 2nd direction which intersects perpendicularly along the periphery side face of said body, and is in the point that the clearance between predetermined spacing is formed between all the another side edges of said contact metallic ornaments, and said periphery side face.

[0006] said -- as having indicated the second description configuration to claim 2 of the column of a claim --

said first description configuration -- in addition, it is in the point that the height which projects toward said periphery side face in the inside side of each another side edge of said contact metallic ornaments is formed. [0007] said -- as having indicated the third description configuration to claim 3 of the column of a claim -- the said first or second description configuration -- in addition, it is in the point which some or all of a side part by the side of a distant place is made crooked toward said periphery side face from said front face of the body of the another side edge located in the maximum distant place, and has formed the flection from said front face of the body of the another side edges of said contact metallic ornaments.

[0008] said -- as having indicated the fourth description configuration to claim 4 of the column of a claim -- the said first, second, or third description configuration -- in addition, it is in the point which has formed the fitting-ed section of the body of a partner connector, and the fitting section which fits in in said front face of the body.

[0009] Effectiveness is explained below at an operation list. According to the description configuration of the above first, thickness can press fit in the clearance FPC (flexible printed circuit board) which suited spacing of said clearance along the extension direction of each another side edge of said contact metallic ornaments from said 2nd direction. while connection by soldering of each another side edge and the terminal on FPC etc. is markedly alike and it is easy-sized, since it is fixed relatively, without FPC connected electrically said each another side edge and circuit board side shifting Generating of defectives, such as a short circuit between the terminals by poor soldering, can be prevented. Moreover, since the protrusion direction (the 1st direction) of the one way each edge of said contact metallic ornaments and the press fit direction (the 2nd direction and hard flow) of FPC intersect perpendicularly, if a hinge shaft and the 1st direction are made in agreement and this connector is prepared in a hinge region, FPC can be pressed fit in said clearance from the direction which intersects perpendicularly with a hinge shaft, i.e., the direction where the circuit board exists, and the press fit activity concerned can be done easily.

[0010] Furthermore, according to the description configuration of the above second, when FPC is pressed fit in said clearance, it can contact stably [the terminal and said height on FPC], and certainly, both electrical installation can be secured without soldering, two or more electrical installation by one press fit actuation can be performed, and workability improves further.

[0011] According to the description configuration of the above third, since FPC pressed fit in said clearance shifting to hard flow with said 1st direction, and moving is regulated by said flection, it becomes trustworthy [the immobilization and positioning between each another side edge and the terminal on FPC] more [it], consequently both electrical installation becomes more certain, and workability and quality improve further further.

[0012] Since mechanical connection of this connector and an other party connector is made also not only between contact metallic ornaments but between the bodies by fitting of said fitting section and the other party's fitting-ed section according to the description configuration of the above fourth, When external force, such as a twist, is added among both connectors, this external force is absorbable with the body, on the other hand, deformation of an edge can be prevented, and said poor contact by the deformation concerned projected from contact metallic ornaments, especially the front face of the body can be avoided. Moreover, when two or more contact metallic ornaments are arranged in the symmetry-of-revolution location (for example, when two contact metallic ornaments are arranged in 180-degree symmetry-of-revolution location), by preparing said fitting section in a rotation non-symmetric position, incorrect fitting can be prevented and each contact metallic ornaments can surely connect with the contact metallic ornaments by which an other party connector corresponds correctly.

[0013]

[Embodiment of the Invention] The gestalt of 1 operation of the connector (only henceforth a connector) concerning this invention is explained based on a drawing below. The connector 1 in this operation gestalt is the male connector which a body 11 and a lid 12 as shown in drawing 4 incorporate and use for a part for the hinge region of the small devices 10, such as a portable telephone constituted rotatable at the circumference of the hinge shaft 13, and is produced possible [a female connector 14 and fitting]. In addition, among drawing 4, it decomposes into covering section 11a located in said lid 12 side, and substrate side body 11b which holds a printed circuit board 15, and said body 11 is illustrated. Moreover, lead-wire 14a pulled out from said female connector 14 connects with said printed circuit board 15 through another connectors 16 and 17.

[0014] In order to use said connector 1 like the above, including in a part for a hinge region, as shown in drawing 1 and drawing 2, it is equipped with the body 2 of a cylindrical shape which consists of an insulating ingredient formed in the magnitude which can be inserted in the cavernous section of the shape of a cylinder for said hinge region. Moreover, the through tubes 7 and 8 for on the other hand making Edges 3a and 4a project toward the 1st direction X where said female connector 14 of the other party and front-face of the body 2a which counters to the front-face of the body 2a of two fitting slots 5 and 6 for making two contact metallic ornaments 3 and 4 insert and attach in each ** and said contact metallic ornaments 3 counters are formed in the body 2.

[0015] Said two contact metallic ornaments 3 and 4 consist of rod-like the aforementioned one side edges 3a and 4a and the J character configuration parts 3b and 4b. On the other hand, the another side edges 3c and 4c of the opposite side of Edges 3a and 4a are formed in the tip side of said J character configuration parts 3b and 4b, and are formed that it should extend toward said said 1st direction X and 2nd direction Y which intersects perpendicularly. Said two contact metallic ornaments 3 and 4 make sequence insert the one side edges 3a and 4a in said through tubes 7 and 8 toward said 1st direction X, respectively, and make said fitting slots 5 and 6 insert the parts of said one side edge 3a of said J character configuration parts 3b and 4b, and the 4a side approach in it, respectively.

[0016] In the condition of having attached said two contact metallic ornaments 3 and 4 in said body 2, said another side edges 3c and 4c of said two contact metallic ornaments 3 and 4 are arranged in parallel on the same field along said 1st direction X, and said J character configuration partial 3b of the contact metallic ornaments 3 of the direction inserted previously is located in said front-face of the body 2a side. Moreover, said another side edges 3c and 4c are located in the outside along with periphery side-face 2b of said body 2, and the clearance 9 between spacing t (about 0.3mm) is formed between said periphery side-face 2bs. This clearance 9 is for pressing fit edge 18a (referring to drawing 3) of FPC18 (flexible printed circuit board) which is the circuit board by the side of said lid 12 so that it may mention later, and, so, the part in which said another side edges 3c and 4c are covered with plate-like at said another side edges 3c and 4c of said periphery side-face 2b is formed evenly, respectively.

[0017] 4d of flections which carry out a crookedness protrusion toward said periphery side-face 2b is formed in the side part located in a distant place side from said front-face of the body 2a of said another side edge 4c of the contact metallic ornaments 4 whose order of insertion of said two contact metallic ornaments 3 and 4 is the back. Although it may shift to said hard flow when opening is carried out also to said 1st direction X and hard flow and edge 18a of said FPC18 is pressed fit, while carrying out opening of said clearance 9 in said 2nd direction, when 4d of this flection does not exist, said edge 18a stops to 4d of said flections, and is positioned, and shifting to said hard flow is regulated.

[0018] Furthermore, the height 19 of the shape of the spherical surface with a periphery side-face 2b [said] and a thickness of about 0.1mm which projects toward said periphery side-face 2b into the part which counters is formed said two insides side of said another side edges 3c and 4c of the contact metallic ornaments 3 and 4 that is,. Therefore, spacing between said each height 19 and said periphery side-face 2b is narrow compared with about 0.2mm and other parts of said clearance 9.

[0019] By the way, on the other hand, since Edges 3a and 4a are arranged at 180-degree symmetry of revolution when [which was projected in said 1st direction X from said two through tubes 7 and 8 and them / said] it sees from said 1st direction X on said front-face of the body 2a, 180 degrees is reversed with said female connector 14 of the other party, and they have a possibility of incorrect-fitting in. In order to avoid this, with this operation gestalt, the rib 20 projected in said 1st direction X is formed in a part of edge section of said front-face of the body 2a, the notching section is prepared in the correspondence part of said female connector 14, and both have the structure where the fitting section and said notching section fit in [said rib 20] mutually as the fitting-ed section. When it sees from said 1st direction X on said front-face of the body 2a with this rib 20, incorrect fitting can be prevented without becoming 180-degree symmetry of revolution.

[0020] As are described above, and it is inserted in a part for a hinge region, and it is elegance a part for connecting electrically and said printed circuit board 15 by the side of said body 11 and said FPC18 by the side of said lid 12 are shown in drawing 3, said connector 1 presses edge 18a of said FPC18 fit in said clearance 9 from said 2nd direction Y, and plans electrical installation of said FPC18 and said connector 1. When said edge

18a is pressed fit in said clearance 9, here gap of said 1st direction X of said edge 18a Since it is regulated by the wall and 4d of said flections by the side of said front-face of the body 2a, while positioning between electrode 18b formed in said edge 18a and said another side edges 3c and 4c is performed correctly In order that said height 19 may contact said electrode 18b more certainly, the good electric contact does not solder said electrode 18b and said another side edges 3c and 4c, and ** does not have a poor contact, either is acquired.

[0021] Another operation gestalt is shown below.

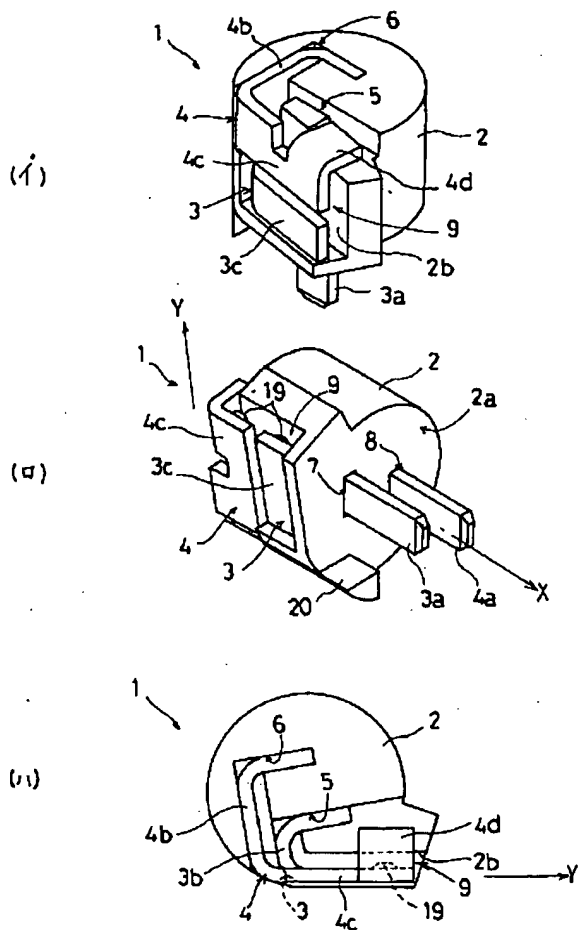
1 In the above-mentioned operation gestalt, although the number of said contact metallic ornaments 3 and 4 was 2, it may not be limited to the above-mentioned operation gestalt, but may be three or more. Moreover, the configuration of said contact metallic ornaments 3 can be changed suitably, and can also change the configuration of said body 2 suitably according to the configuration of an other party connector. Moreover, the spacing t of said clearance 9 can be suitably changed according to the thickness of said edge 18a of said FPC18 of the other party.

[0022] **2** With the above-mentioned operation gestalt, although said height 19 was formed in said another side edges 3c and 4c, you may not necessarily prepare. Moreover, the contact between electrode 18b formed in said edge 18a and said another side edges 3c and 4c may not be based on a pressure welding, but may be performed with soldering.

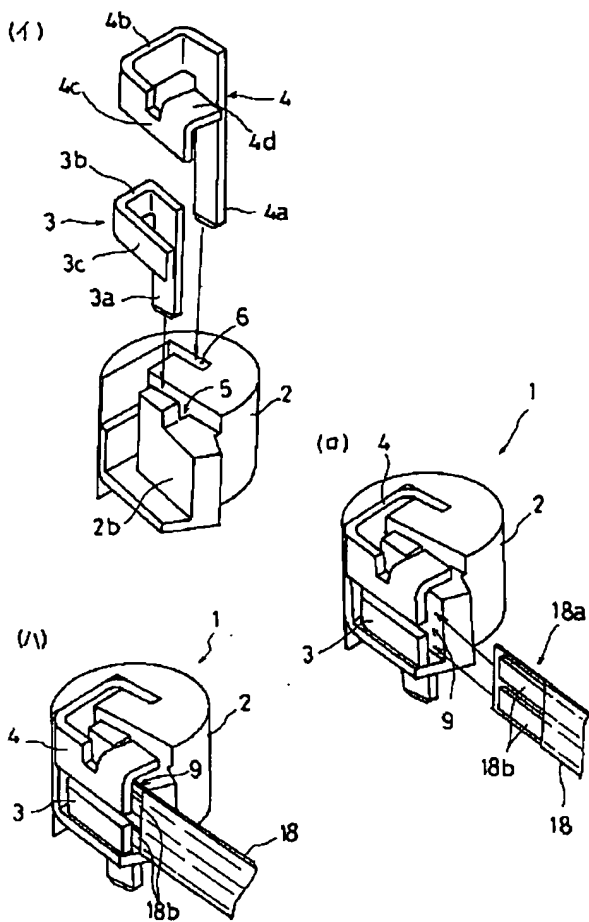
[0023] **3** Although 4d of said flections was prepared in said another side edge 4c of said contact metallic ornaments 4 and gap of said FPC18 was regulated with the above-mentioned operation gestalt, 4d of said flections may not necessarily be prepared. Moreover, instead of forming 4d of said flections in said another side edge 4c side, the projection of the thickness equivalent to the spacing t of said clearance 9 is prepared in the part corresponding to 4d of said flections of said periphery side-face 2b, and you may make it regulate gap of said FPC18. In addition, when this projection is too large, the resistance at the time of insertion on said body 2 of said contact metallic ornaments 3 and 4 becomes large, and there is a possibility that the workability at the time of assembly may be checked.

[0024] **4** Said connector 1 may be used for the application except using it, including in a part for the hinge region of the small devices 10, such as a portable telephone as shown in drawing 4 .

[Translation done.]

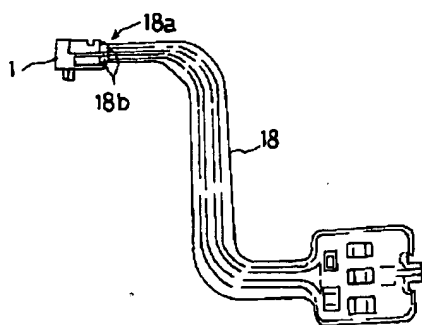
Drawing selection 

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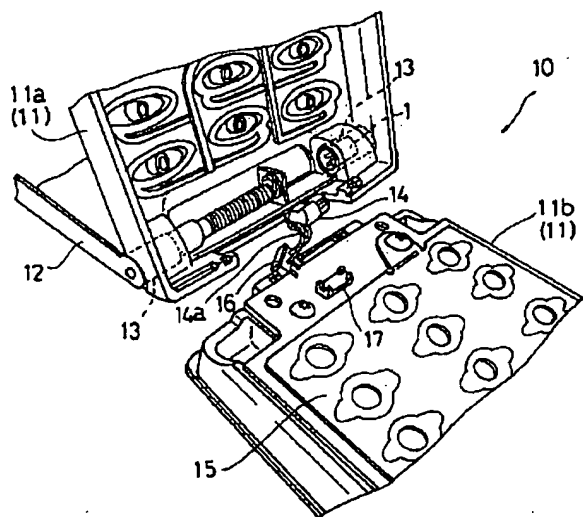
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Drawing selection



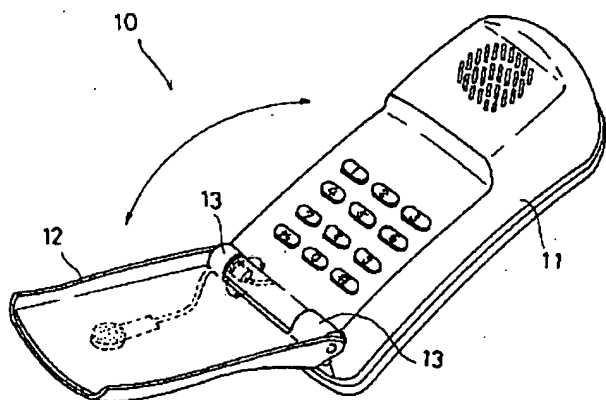
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